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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/007,766	11/08/2001	Brad R. Lewis	30014200-1002	3626

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SONNENSCHEIN NATH & ROSENTHAL LLP		NAHAR, QAMRUN
FOR SUN MICROSYSTEMS		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Office Action Summary	10/007,766	LEWIS ET AL.
	Examiner	Art Unit	
	Qamrun Nahar	2191	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>06 April 2007</u>.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-26</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-26</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

1.   This action is in response to the amendment filed on 04/06/2007.

2.   Claims 1-26 are pending.

Response to Amendment

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

4.   Claims 1-2, 7-8, 12-13, 18-20 and 23-25 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Calder (U.S. 5,963,972) in view of Lomet (U.S. 5,870,763), and further in

view of Serra (U.S. 6,226,787).

Per Claim 1:

        Calder teaches dividing the memory into blocks (column 4, lines 29-40); assigning at

least a portion of the data and at least one code segment to each block (column 3, lines 56-62;

Table 1 in column 4, lines 8-17; and see Figure 4 for the mapping of the data and code segment

to the cache memory); determining whether dependencies exist among the blocks such that a first

block depends on data assigned to a second block; and generating a graph representing the

blocks and the determined dependencies (column 3, lines 56-66; column 7, lines 6-56; column 8,

lines 10-54; and column 12, lines 25-37). Calder does not explicitly teach storing data read and

data write identifiers for each code segment, the data read and data write identifiers identifying at least a portion of the data read or written by the code segment or determining whether dependencies exist among the blocks such that a first block depends on data assigned to a second block using the read and write identifiers or facilitating development of the data flow program by generating a graph representing the blocks and the determined dependencies and displaying the graph to a user.

Lomet teaches storing data read and data write identifiers for each code segment, the data read and data write identifiers identifying at least a portion of the data read or written by the code segment ("state identifier field" in column 18, lines 30-31 and lines 55-59); determining whether dependencies exist among the blocks such that a first block depends on data assigned to a second block using the read and write identifiers (column 19, lines 1-35); and facilitating development of the data flow program by generating a graph representing the blocks and the determined dependencies (column 18, line 55 to column 19, line 21).

It would have been obvious to one having ordinary skill in the computer art at the time of the invention was made to modify the method disclosed by Calder to include storing data read and data write identifiers for each code segment, the data read and data write identifiers identifying at least a portion of the data read or written by the code segment; determining whether dependencies exist among the blocks such that a first block depends on data assigned to a second block using the read and write identifiers; and facilitating development of the data flow program by generating a graph representing the blocks and the determined dependencies using the teaching of Lomet. The modification would be obvious because one of ordinary skill in the

art would be motivated to minimize cache misses by ensuring the proper order of computer

operations (Calder, column 1, lines 17-39).

However, Lomet does not explicitly teach displaying the graph to a user. Serra teaches

displaying the graph to a user (column 2, lines 29-42).

It would have been obvious to one having ordinary skill in the computer art at the time of

the invention was made to modify the method disclosed by Lomet to include displaying the

graph to a user using the teaching of Serra. The modification would be obvious because one of

ordinary skill in the art would be motivated to provide a visualization of the internal structure of

a program (Serra, column 2, lines 22-26).

Per Claim 2:

The rejection of claim 1 is incorporated, and the combination of Lomet and Serra further

teaches wherein the step of displaying comprises the step of displaying a graph comprising nodes

assigned to the blocks and dependency arcs representing the determined dependencies (Lomet,

column 18, line 55 to column 19, line 21; and Serra, column 2, lines 29-42).

Per Claim 7:

The rejection of claim 1 is incorporated, and Serra further teaches wherein the data

includes a data structure, and wherein the step of displaying further comprises the step of:

facilitating visualization of at least a portion of the data structure accessed by at least one of the

code segments by graphically presenting at least a portion of the data structure and accentuating

the portion of the data structure accessed by the at least one code segment (column 2, lines 51-63).

Per Claim 8:

This is another version of the claimed method discussed above, claim 1, wherein all claim limitations also have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, this claim is also obvious.

Per Claims 12, 13, & 18:

These are computer-readable medium versions of the claimed method discussed above (claims 1, 2 and 7, respectively), wherein all claim limitations also have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, these claims are also obvious.

Per Claim 19:

This is another version of the claimed method discussed above (claims 1 and 6), wherein all claim limitations also have been addressed and/or covered in cited areas as set forth above, including "while the code segments are executing, determining which nodes in the graph are unexecuted nodes and which nodes in the graph are executed nodes; and displaying the unexecuted nodes in a manner visually distinctive from the executed nodes" (Serra, column 2, lines 51-63). Thus, accordingly, this claim is also obvious.

Per Claim 20:

This is a data processing system version of the claimed method discussed above (claims 1 and 2), wherein all claim limitations also have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, this claim is also obvious.

Per Claim 23:

This is a data processing system version of the claimed method discussed above (claims 1 and 2), wherein all claim limitations also have been addressed and/or covered in cited areas as set forth above, including "means for apportioning a memory into regions and associating the data and the code segments with the regions" (Calder, column 3, lines 56-62; Table 1 in column 4, lines 8-17; and see Figure 4 for the mapping of the data and code segment to the cache memory). Thus, accordingly, this claim is also obvious.

Per Claim 24:

This is a computer readable memory device version of the claimed method discussed above, claim 1, wherein all claim limitations also have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, this claim is also obvious.

Per Claim 25:

The rejection of claim 24 is incorporated, and Calder further teaches wherein the data structure further comprises: a processed flag that indicates whether at least one of the nodes is executed or unexecuted (column 5, lines 36-49).

5.   Claims 3-4, 6, 9-11, 14-15, 17 and 21-22 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Calder (U.S. 5,963,972) in view of Lomet (U.S. 5,870,763), further in view of

Serra (U.S. 6,226,787), and further in view of Ju (U.S. 6,175,957).

Per Claim 3:

The rejection of claim 2 is incorporated, and Serra further teaches displaying executed

nodes of the graph (column 2, lines 51-63). However, the combination Calder, Lomet, and Serra

fails to teach the step of displaying further comprises the step of presenting the dependency arcs

using a satisfied dependency visualization when the determined dependency is satisfied, and

presenting the dependency arcs using an unsatisfied dependency visualization when the

determined dependency is unsatisfied. Ju teaches the step of presenting the dependency arcs

using a satisfied dependency visualization when the determined dependency is satisfied, and

presenting the dependency arcs using an unsatisfied dependency visualization when the

determined dependency is unsatisfied (column 10, lines 1-9).

It would have been obvious to one having ordinary skill in the computer art at the time of

the invention was made to modify the method disclosed by the combination Calder, Lomet, and

Serra to include the step of presenting the dependency arcs using a satisfied dependency

visualization when the determined dependency is satisfied, and presenting the dependency arcs

using an unsatisfied dependency visualization when the determined dependency is unsatisfied

using the teaching of Ju. The modification would be obvious because one of ordinary skill in the

art would be motivated to display performance information to a user.

Per Claim 4:

The rejection of claim 2 is incorporated, and the combination of Serra and Ju further teaches further comprising the steps of: receiving a node selection specifying a selected one of the nodes; determining unmet dependencies for the selected node; and displaying in a visually distinctive manner the unmet dependencies in the graph (Serra, column 3, lines 30-34; and Ju, column 10, lines 1-9).

Per Claim 6:

The rejection of claim 2 is incorporated, and the combination of Serra and Ju further teaches wherein nodes are assigned to the blocks include executed nodes and unexecuted nodes, and wherein the step of displaying further comprises the step of displaying the unexecuted nodes using an unexecuted visualization and the executed nodes using an executed visualization (Serra, column 2, lines 51-63; and Ju, column 10, lines 1-9).

Per Claim 9:

This is another version of the claimed method discussed above, claim 6, wherein all claim limitations also have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, this claim is also obvious.

Per Claim 10:

The rejection of claim 9 is incorporated, and Serra further teaches wherein the nodes

include executing nodes, and wherein the step of displaying comprises the step of displaying the

executing nodes with an executing visualization (column 2, lines 51-63).

Per Claim 11:

This is another version of the claimed method discussed above, claim 3, wherein all claim

limitations also have been addressed and/or covered in cited areas as set forth above. Thus,

accordingly, this claim is also obvious.

Per Claims 14-15 & 17:

These are computer-readable medium versions of the claimed method discussed above

(claims 3-4 and 6, respectively), wherein all claim limitations also have been addressed and/or

covered in cited areas as set forth above. Thus, accordingly, these claims are also obvious.

Per Claims 21-22:

These are data processing system versions of the claimed method discussed above

(claims 6 and 3, respectively), wherein all claim limitations also have been addressed and/or

covered in cited areas as set forth above. Thus, accordingly, these claims are also obvious.

6.   Claims 5, 16 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Calder (U.S. 5,963,972) in view of Lomet (U.S. 5,870,763), and further in view of Serra (U.S.

6,226,787), and further in view of Cai (U.S. 6,349,363).

Per Claim 5:

The rejection of claim 2 is incorporated, and further, the combination of Calder, Lomet and Serra does not explicitly teach providing for execution of the code segments using threads; receiving a thread selection specifying at least one of the threads; and displaying nodes executed by the at least one thread. Cai teaches providing for execution of the code segments using threads; receiving a thread selection specifying at least one of the threads; and displaying nodes executed by the at least one thread (column 7, lines 30-40).

It would have been obvious to one having ordinary skill in the computer art at the time of the invention was made to modify the method disclosed by the combination of Calder, Lomet and Serra to include the step of providing for execution of the code segments using threads; receiving a thread selection specifying at least one of the threads; and displaying nodes executed by the at least one thread using the teaching of Cai. The modification would be obvious because one of ordinary skill in the art would be motivated to provide improved memory performances (Cai, column 1, lines 61-67 to column 2, lines 1-2).

Per Claim 16:

This is a computer-readable medium version of the claimed method discussed above, claim 5, wherein all claim limitations also have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, this claim is also obvious.

Per Claim 26:

This is a computer readable memory device version of the claimed method discussed above, claim 5, wherein all claim limitations also have been addressed and/or covered in cited areas as set forth above. Thus, accordingly, this claim is also obvious.

Response to Arguments

7.   Applicant's arguments filed on 04/06/2007 have been fully considered but they are not persuasive.

In the remarks, the applicant argues that:

a)   Applicants respectfully submit that there is no motivation to combine Calder, Lomet, and Serra as suggested by the Examiner. The Examiner asserts that the modification would be obvious because one of ordinary skill in the art would be motivated to minimize cache misses by ensuring the proper order of computer operations. However, this does not explain what benefit Serra provides in this hypothetical combination. The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. In re Mills, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). Because Calder is directed to a code reordering algorithm for optimizing a cache and does not require human input or intervention, there is no reason for displaying Calder's graph to a user. Thus, modifying Calder with Serra offers no benefit, and therefore the desirability of the combination is not established.

For at least these reasons, *prima facie* obviousness has not been established, and claim 1 is patentable over the combination of Calder, Lomet, and Serra. Claims 8, 12, 20, 23, and 24 also recite similar limitations, and are therefore patentable for at least the same reasons.

Examiner's response:

a)   In response to applicant's argument that there is no suggestion to combine the references,

the examiner recognizes that obviousness can only be established by combining or modifying the

teachings of the prior art to produce the claimed invention where there is some teaching,

suggestion, or motivation to do so found either in the references themselves or in the knowledge

generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5

USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992).

In this case, there is motivation to combine Calder, Lomet, and Serra. Lomet teaches facilitating

development of the data flow program by generating a graph representing the blocks and the

determined dependencies (column 18, line 55 to column 19, line 21). However, Lomet does not

explicitly teach displaying the graph to a user. Serra teaches displaying the graph to a user

(column 2, lines 29-42).

It would have been obvious to one having ordinary skill in the computer art at the time of

the invention was made to modify the method disclosed by Lomet to include displaying the

graph to a user using the teaching of Serra. The modification would be obvious because one of

ordinary skill in the art would be motivated to provide a visualization of the internal structure of

a program (Serra, column 2, lines 22-26).

In addition, see the rejection above in paragraph 4 for rejection to claims 1, 8, 12, 20, 23,

and 24.

In the remarks, the applicant argues that:

b)   Regarding claim 2, the combination of Calder, Lomet, and Serra fails to teach or suggest

a graph comprising nodes assigned to the blocks and dependency arcs representing the

determined dependencies. Unlike Applicants' claimed invention in which graph nodes are

assigned to blocks of memory, Calder's graph nodes merely correspond to units of instructions --

the units of instructions do not correspond to blocks of memory. In response, the Examiner

asserts that "a block is a group of instructions in a program that are treated as a unit. Therefore,

the unit is store in one block of memory." The Examiner's assertion is incorrect. A block, in

claim 1, is assigned both a portion of data and at least one code segment. Thus, Calder's

assignment of nodes to units of instruction cannot be construed as an assignment of nodes to

blocks of memory. Further, it is irrelevant that the unit of code instruction in Calder is stored in

one block of memory, as alleged by the Examiner, because it is still the instruction that is

assigned the node, not the block of memory. Accordingly, Calder's graph nodes do not

correspond to blocks of memory and thus cannot teach or suggest this limitation.

For at least these reasons, prima facie obviousness has not been established, and claim 2

is patentable over the combination of Calder, Lomet, and Serra. Claim 9 recites similar

limitations and is therefore patentable for at least the same reasons.

Examiner's response:

b)   Examiner strongly disagrees with applicant's assertion that the combination of Calder,

Lomet, and Serra fails to disclose the claimed limitations recited in claims 2 and 9. The

combination of Calder, Lomet, and Serra clearly shows each and every limitation in claims 2 and

9. By definition, a block is a group of instructions in a program that are treated as a unit.

Therefore, the unit is stored in one block of memory. Each instruction has data that it operates on.

In addition, see the rejection above in paragraphs 4 and 5 for rejection to claims 2 and 9, respectively.

In the remarks, the applicant argues that:

c)   Regarding claim 19, the combination of Calder, Lomet, and Serra does not teach or suggest the generation and display of a graph depicting dependencies among memory regions, as previously discussed. Furthermore, the combination fails to teach or suggest "while the code segments are executing, determining which nodes in the graph are unexecuted nodes and which nodes in the graph are executed nodes; and displaying the unexecuted nodes in a manner visually distinctive from the executed nodes." As previously discussed with regard to claim 6, Razdow does not visually distinguish between executed and unexecuted nodes. Accordingly, primafacie obviousness has not been established, and claim 19 is patentable over Calder, Lomet, and Serra.

Examiner's response:

c)   The Examiner has already addressed applicant's arguments regarding the generation and display of a graph depicting dependencies among memory regions in the Examiner's Responses (a) and (b) above. Furthermore, Serra is relied upon for the limitation "while the code segments are executing, determining which nodes in the graph are unexecuted nodes and which nodes in the graph are executed nodes; and displaying the unexecuted nodes in a manner visually distinctive from the executed nodes.", not Razdow.

In addition, see the rejection above in paragraph 4 for rejection to claim 19.

In the remarks, the applicant argues that:

d)   Claims 3-4, 6, 9-11, 14-15, 17, and 21-22 are rejected under 35 U.S.C. §103(a) as being

allegedly unpatentable over Calder in view of Lomet and Serra, and further in view of Ju (US.

Patent No. 6,175, 957). Applicants respectfully traverse the rejection.

Claims 1, 12, and 24 are allowable as discussed above. Ju still fails to disclose or suggest

Applicants' claimed data read and data write identifiers and fails to disclose or suggest

determining dependencies based on the data read and data write identifiers. Therefore, Calder in

view of Lomet, Serra and Ju still fails to disclose or suggest claims 1, 12, and 24.

Claims 3-4, 6, 9-11, 14-15, 17, and 21-22 depend directly or indirectly from claims 1, 12,

or 24 and are therefore allowable for at least the same reasons that claims 1, 12, and 24 are

allowable.

Examiner's response:

d)   In response to applicant's arguments against the references individually, one cannot show

nonobviousness by attacking references individually where the rejections are based on

combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re*

Merck & Co., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

In addition, see the rejection above in paragraph 5 for rejection to claims 3-4, 6, 9-11, 14-

15, 17, and 21-22.

In the remarks, the applicant argues that:

e)   Claims 5, 16, and 26 are rejected under 35 U.S.C. §103(a) as being allegedly

unpatentable over Calder in view of Lomet and Serra, and further in view of Cai (US. Patent No.

6, 349, 363). Applicants respectfully traverse the rejection.

Claims 1, 12, and 24 are allowable as discussed above. Cai still fails to disclose or

suggest Applicants' claimed data read and data write identifiers and fails to disclose or suggest

determining dependencies based on the data read and data write identifiers. Therefore, Calder in

view of Lomet, Serra and Cai still fails to disclose or suggest claims 1, 12, and 24.

Claims 5, 16, and 26 depend directly or indirectly from claims 1, 12, or 24 and are

therefore allowable for at least the same reasons that claims 1, 12, and 24 are allowable.

Examiner's response:

e)   In response to applicant's arguments against the references individually, one cannot show

nonobviousness by attacking references individually where the rejections are based on

combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re*

Merck & Co., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

In addition, see the rejection above in paragraph 6 for rejection to claims 5, 16, and 26.

Conclusion

8.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time

policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing

date of this final action.

9.   Any inquiry concerning this communication from the examiner should be directed to

Qamrun Nahar whose telephone number is (571) 272-3730. The examiner can normally be

reached on Mondays through Fridays from 9:30 AM to 6:00 PM.

        If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Wei Y Zhen, can be reached on (571) 272-3708. The fax phone number for the

organization where this application or processing is assigned is (571) 273-8300.

        Any inquiry of a general nature or relating to the status of this application or proceeding

should be directed to the TC 2100 Group receptionist whose telephone number is 571-272-2100.

        Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

QN
June 6, 2007